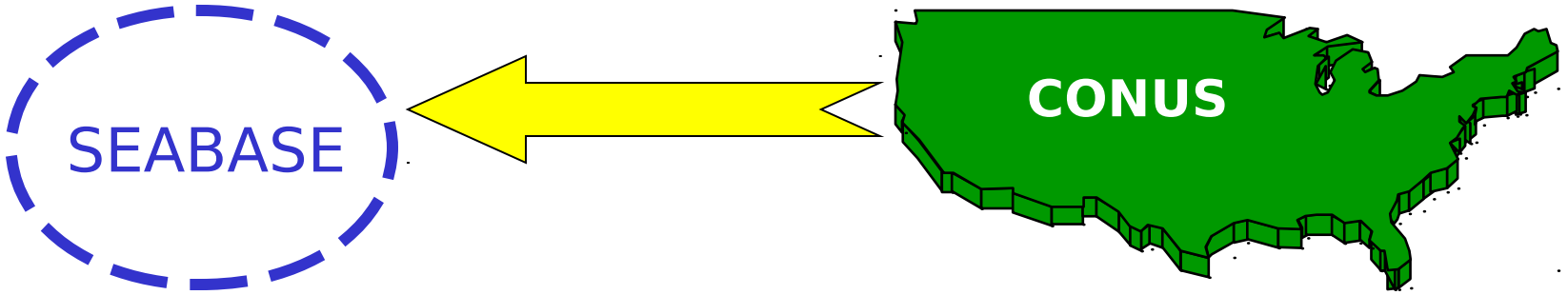
Rapid Strategic Lift Ship (RSLS)
FY 04 Feasibility Studies

February 2005



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Background

RSLS Mission Is to Transport Critical, Non Pre-positioned Elements From CONUS to a Sea Base

Major Capabilities Desired (19 Feb 04 N42 Tasking)

- 36 – 39 Knot Transit Speed
- 8000 – 10000 Nm Range
- Transport Marine Expeditionary Brigade Rotary Wing Aircraft (20 CH-53E, 18 AH-1Z, 9 UH-1Y, 10 CH-60)
- 1000 – 3000 Passengers
- 3000 Tons of Cargo in 250 Containers
- Flight Deck With One Land/Launch Spot

Study Objectives

- ✓ Develop RSLS concept designs
- ✓ Conduct feasibility studies to validate concept design assumptions and estimates
- ✓ Develop cost estimates to support financial planning for the program
- ✓ Identify technical risks and R&D needs
- ✓ Propose recommendations for future work

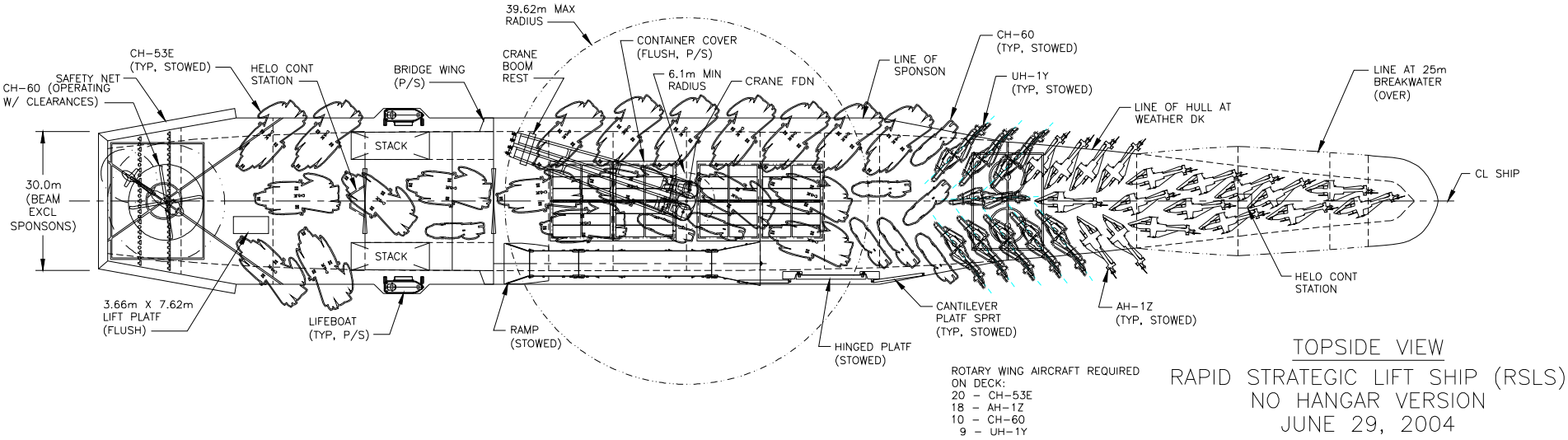
Two Concepts Studied

- Prior studies showed that a ship concept that stowed all aircraft and other cargo internally in selectable offload holds would approach 50,000 tons displacement
- Two alternative concepts were conceived for RSLS feasibility studies to reduce ship size:

Aircraft stowed on the weather deck, with the other cargo limited to containers in cell guides

Aircraft stowed internally, and other cargo stacked on the weather deck in containers

No-Hangar Variant Configuration



Fatal Flaws

- The cargo aircraft, when loaded according to NAVAIR recommendations, take up too much space to be practically accommodated on a single deck.
- Weather deck loading of cargo aircraft is undesirable

Valuable Insight

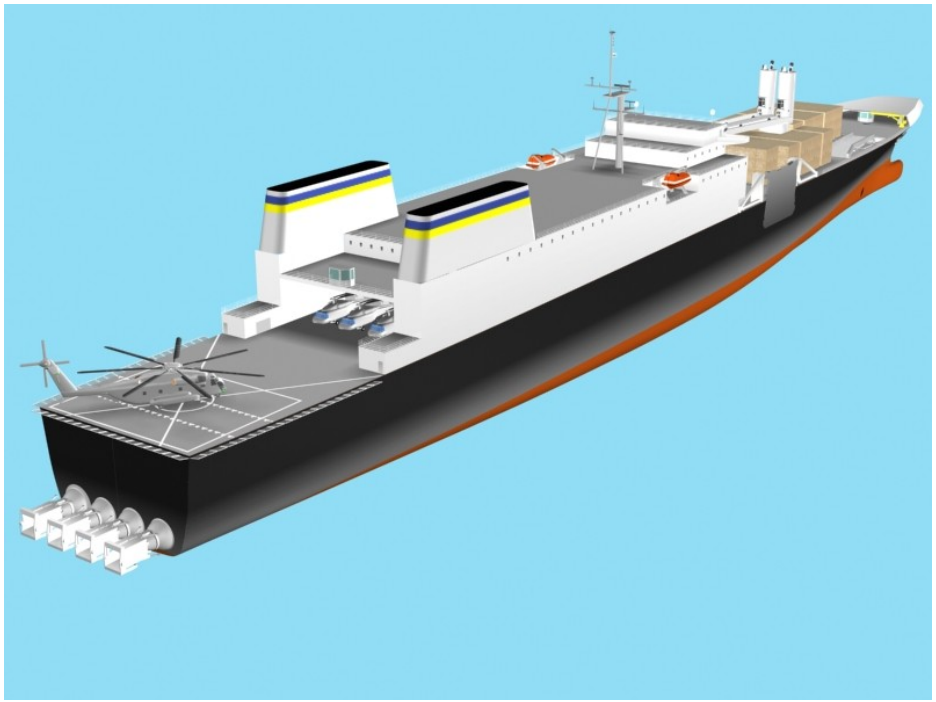
- Deck stowage of containers is more desirable for RSLS than internal cell guides.

Propulsion Trade Study
More Valuable Insights

	No-Hangar Baseline	Design Excursions	
Propulsors	4 x Controllable Pitch Propellers	4 x Controllable Pitch Propellers	4 x Waterjets
Main Engines	4 x MT30 Gas Turbines	8 x LM2500+ Gas Turbines	4 x MT30 Gas Turbines
Sustained Speed	34.5 kts (Below Threshold)	36 kts	37 kts
Propulsion Power	144,000 kW	221,000 kW	144,000 kW

- Waterjet Propulsion Clearly More Efficient for RSLS Speeds
- Waterjet Risk Comparable to Propeller

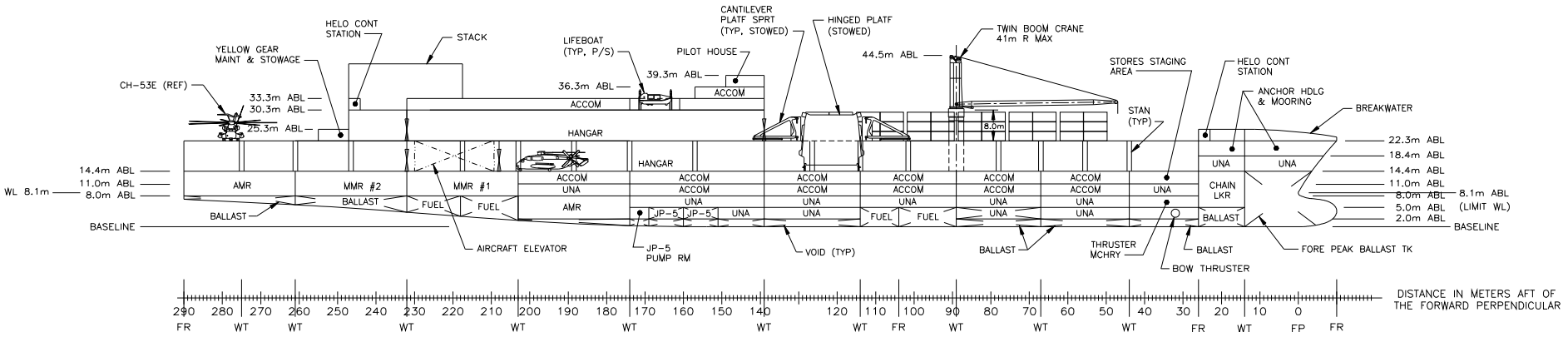
Hangar Variant



- Feasible Design
- Relatively Low Risk for FY12 Procurement

	Hangar Variant
Propulsors	4 x Waterjets
Main Engines	4 x MT30 Gas Turbines
Sustained Speed	36 kts
Range at Sustained Speed	8,000 nm
Propulsion Power	144,000 kW
Waterline Length	290 m
Waterline Beam	32 m
Hull Depth	22.3 m
Full Load Draft	8.1 m
Lightship Weight	23,188 t
Fuel Weight	7,782 t
Other Loads	4,642 t
Full Load Weight	35,612 t

Hangar Variant Study Insights



- Aft flight deck precludes stern ramp
- Single flight deck spot may be a choke point
- Feasible and advantageous to build without a seawater ballasting system to compensate for fuel burn-off

R&D Needs

High Speed Ship (HSS) R&D Budget Funding RSLS to Meet Threshold Desired Capabilities with FY12 Contract Award								
	Funding Profiles							
Description	FY06	FY07	FY08	FY09	FY10	FY11	FY12	Totals
Technology Risk Reduction								
Hullform Development	0.5	0.5						1
Propulsor Development	3	3	3					9
Hull and Propulsor Integration	1	1	0.7					2.7
Lightweight High-Power Reduction Gear Development								0
Lightweight Structures Development								0
Lightweight Auxiliary Systems Development	0.5							0.5
Program Acquisition Efforts								0
Pre-Acquisition/Initiail Capabilities Development	0.5							0.5
Concept Refinement	2	3						5
Total Ship Design			3.3	8	9	14		34.3
Industry Risk Reduction Efforts	0.5	0.5	28	17	31	36		113
Total	8	8	35	25	40	50		166

R&D Focused on

- Preparing Government Analytical Tools and Procedures for Evaluating Industry Designs
- Retiring Propulsion System Risks
- Preparing Industry for Design and Build That Is Outside Current Experience

Planned FY05 Work

Concept Studies for Requirements Development

- Design to different capabilities
- Producibility assessment
- Primary and secondary mission analysis
- Impact of advanced technology
- Alternate hullforms
- Multiple ships for mission

Technology Development

- Hullform development
- Propulsor development
- Hull / Propulsor integration
- ABS structures assessment
- Lightweight systems identification

Conclusions

- RSLS threshold desired capabilities are feasible and low risk with R&D investment
- FY05 Concept studies will help to define requirements trade space
- FY05 Technology development studies will create detailed map for risk management

Backup

Rapid Strategic Lift Ship (RSLS) No-Hangar Variant

DIMENSIONS

Length, LBP:	272.0 m
Length, Overall:	289.6 m
Beam, DWL:	27.0 m
Beam, Weather Deck:	36.0 m
Navigational Draft:	8.1 m

PERFORMANCE

Sustained Speed:	35.2 knots
Shaft Power:	144,000 kW
Endurance:	8,000 nm @ 35.8 knots
Service Life:	40 Years

ACCOMMODATIONS

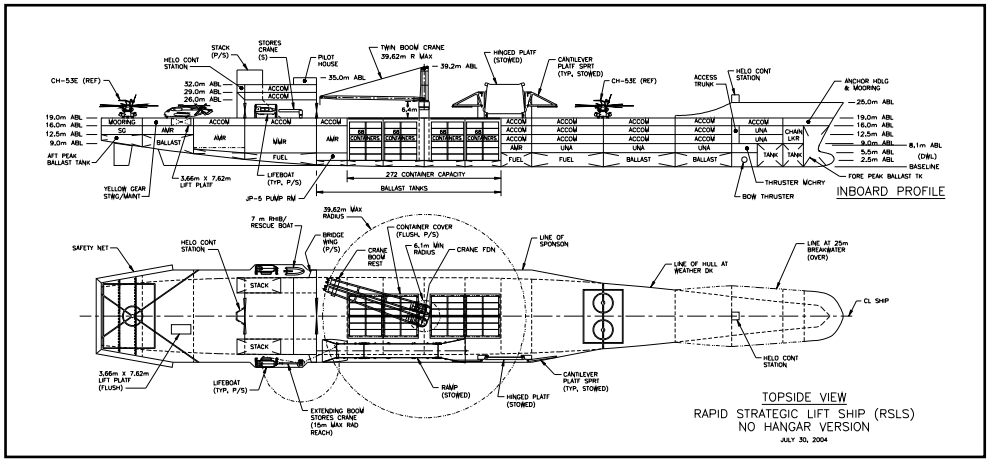
	Off/ Lic	CPO/ SNCO	Enlisted/ Unlic	
Total				
MSC	15	-	25	40
Navy	240	165	1,245	1,650
Total	255	165	1,250	1,690

Habitability: Mixed Gender Compliant
Navy accommodations to LHD 8-like standards

Accommodation Area: 10,550 m2

AVIATION FACILITIES

Navair Certifiable Flight Deck (both operating spots)
Aircraft: 20 CH-53E
18 AH-1Z
9 UH-1Y
10 CH-60
Land/Launch Spots: Two
Hangar: N/A
Aircraft Elevators: N/A



MACHINERY SYSTEMS

Gas Turbine Propulsion System
4 x 36,000 kW Rolls-Royce MT30 Gas Turbine Propulsion Engines
6 x 2,500 kW Ship's Service Diesel Generators
One 600 kW Emergency Diesel Generator
4 x 6 m Diameter Controllable Pitch Propellers

AUXILIARY SYSTEMS

Cargo Crane: One single pedestal, twin boom cargo crane (130' max radius)
Stores Crane: One, 5 ton capacity (50' max radius)
Lift Platform: One @ 25' L x 12' W
Container Hatches: Eight @ 45' L x 26' W Pontoon type
External Ramp: One, portable, capacity 35 Stons
Ramp Platform: One, deck edge, hinged
UNREP: Two FAS, receive only (one port & one stbd)
One RAS, receive only

NAVIGATION,COMMAND & CONTROL

Similar to LMSR 300/310 Class

CARGO CAPACITY

RO/RO: 5,700 m2, available weather deck stowage when aircraft have been offloaded
Containers: 272 TEU (total capacity)
JP5 Stowage: 405 Stons
Potable Water: 24 Stons (aircraft washdown)

LIFESAVING

USCG Certified(Cargo and Misc. Vessels)
Lifeboats: Two - 50 person capacity
Liferafts: 68 - 25 person (port & stbd)
Rescue Boat: One 7m RHIB

MAINTENANCE FACILITIES

Aircraft Maintenance: O-Level
Vehicle Maintenance: Minimal capabilities (similar to LMSR)

WEIGHTS (metric tons)

SWBS 100	10,624
SWBS 200	1,520
SWBS 300	1,107
SWBS 400	38
SWBS 500	2,618
SWBS 600	1,686
SWBS 700	2
Lightship	17,595
Margin (12% D & B)	2,111
Lightship w/margin	19,706
Loads	12,514
Full Load	32,220

Service Life Allowance 5% weight
0.5 ft. KG

STABILITY

USCG/MARAD Two-Compartment Damage Stablity

SURVIVABILITY

Mounts for MILDET anti-terrorist/ Force protection (AT/FP) weapons

HULL STRUCTURE

Commercial
ABS Steel Vessel Rules

PROVISIONS

Ship: 30 day (chill)
60 days (all others)
Troop: 20 days

MEDICAL FACILITIES

Medical Operating Rooms: One
Hospital Ward: Two beds
(similar to LMSR 300/310 Class)

Rapid Strategic Lift Ship (RSLS) Hangar Variant

DIMENSIONS

Length, LBP:	290.0 m
Length, Overall:	300.0 m
Beam, DWL:	32.0 m
Beam, Weather Deck:	32.0 m
Navigational Draft:	8.1 m

PERFORMANCE

Sustained Speed:	36 knots
Shaft Power:	144,000 kW
Endurance:	8,000 nm @ 36 knots
Service Life:	40 Years

ACCOMMODATIONS

	Off/ Lic	CPO/ SNCO	Enlisted/ Unlic	
Total				
MSC	15	-	25	40
Navy	240	165	1,245	1,650
Total	255	165	1,250	1,690

Habitability: Mixed Gender Compliant Navy accommodations to LHD 8-like standards

Accommodation Area: 10,700 m2

AVIATION FACILITIES

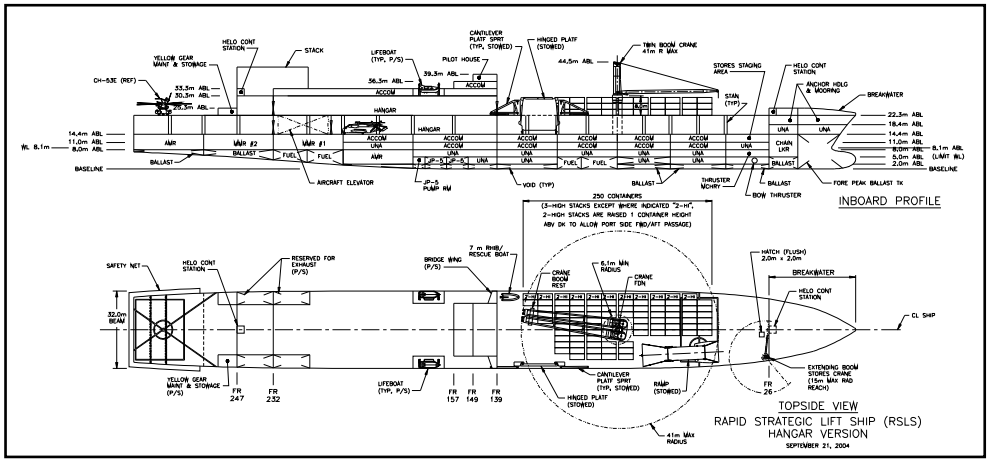
Navair Certifiable Flight Deck (both operating spots)

Aircraft: 20 CH-53E
18 AH-1Z
9 UH-1Y
10 CH-60

Land/Launch Spots: Two

Hangar: Deckhouse: 2,645 m2
Below Deck: 6,250 m2

Aircraft Elevators: One, interior, 68' L x 35' W



MACHINERY SYSTEMS

Gas Turbine Propulsion System
4 x 35.2 mW (47,200 hp) Rolls-Royce MT30 Gas Turbine Propulsion Engines
6 x 2,500 kW Ship's Service Diesel Generators
One 2,000 kW Emergency Diesel Generator
4 x Water Jets

AUXILIARY SYSTEMS

Cargo Crane: One single pedestal, twin boom cargo crane (135' max radius)

Stores Crane: One, 5 ton capacity (50' max. radius)

External Ramp: One, portable, capacity 35 Stons

Ramp Platform: One, deck edge, hinged (stbd)

UNREP: Two FAS, receive only (one port & one stbd)
One RAS, receive only

NAVIGATION,COMMAND & CONTROL

Similar to LMSR 300/310 Class

CARGO CAPACITY

RO/RO: 5,950 m2 available (max.) @ 22.3 m Level
6,250 m2 available (max.) @ 14.4 m Level (Stowage area available when all aircraft have been offloaded)

Containers: 250 TEU (minimum capacity) Stowed in 3-high Stacks, with exception of portside outboard 2-high row

JP5 Stowage: 405 Stons

Potable Water: 24 Stons (aircraft washdown)

LIFESAVING

USCG Certified(Cargo and Misc. Vessels)

Lifeboats: Two - 50 person capacity

Liferafts: 68 - 25 person (port & stbd)

Rescue Boat: One 7m RHIB

WEIGHTS (metric tons)

SWBS 100	12,105
SWBS 200	1,147
SWBS 300	1,218
SWBS 400	45
SWBS 500	3,932
SWBS 600	2,255
SWBS 700	2
Lightship	20,703
Margin (12%)	2,485
Lightship w/margin	23,188
Loads	12,424
Full Load	35,612

Service Life Allowance 5% weight
0.5 ft. KG

STABILITY

USCG/MARAD Two-Compartment Damage Stablity

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Hangar Variant Aircraft Stowage